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Scope and Sequence

Grade	Emphasis	Topic
1	Science Science Technology Science Science	Creating Colour Seasonal Changes Building Things Senses Needs of Animals and Plants
2	Science Technology Science Science Science	Exploration of Liquids Buoyancy and Boats Magnetism Hot & Cold Temperature Small Crawling and Flying Animals
3	Science Technology Science Science Science	Rocks and Minerals Building with a Variety of Materials Testing Materials and Designs Hearing and Sound Animal Life Cycles
4	Science Technology Science Science Science	Waste and Our World Building Devices and Vehicles That Move Wheels and Levers Light and Shadows Plant Growth and Changes
5	Science Technology Science Science Science	Electricity and Magnetism Mechanisms Using Electricity Classroom Chemistry Weather Watch Pond Ecosystem
6	Science Technology Science Science Science	Air and Aerodynamics Flight Sky Science Evidence and Investigations Tree and Forest

Note: The above chart indicates placement of topics by grade level. The order of topics within a grade level may be varied as part of the instructional plan.

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Learner Expectations

GRADE LEVEL 1

Science Inquiry

General Learner Expectations *Students will be able to:*

1-1 Bring focus to investigative activities based on questions asked by self and by others.

1-2 Describe materials and objects that the student has observed and manipulated; identifying what the student did and what the student found out.

Specific Learner Expectations

In the context of units of study identified for grade level 1, the student will demonstrate the following **science inquiry skills:**

Focus
- identify the question which is being investigated

Plan
- recognize steps in a plan, and describe what is being done in each step (based on independent activity, on directed activity, and on observing the activity of others)

Take Action
- carry out the identified procedures
- communicate observations orally, and represent those observations through drawing a picture

Evaluate
- explain results (explanations may reflect an early stage of concept development)
- identify new questions that arise from what was learned

Technology and Problem Solving

General Learner Expectation *Students will be able to:*

1-3 With guidance, use materials provided to create a structure that achieves a given purpose.

Specific Learner Expectations

In the context of units of study identified for grade level 1, the student will demonstrate the following **technological problem-solving skills**:

Focus
- identify the purpose (What is to be developed? What is it to do?)

Plan
- identify materials that could be used in solving a problem

- recognize that a construction task involves a sequence of steps, and identify steps that are followed.

Take Action

- show readiness to engage in all parts of the task
- demonstrate persistence and confidence in construction tasks

Evaluate

- evaluate the product
- identify how the product might be used

Attitudes

General Learner Expectation *Students will be able to*:

1-4 Demonstrate positive attitudes for the study of science and for the application of science in responsible ways.

Specific Learner Expectations

Students will show growth in acquisition and application of the following traits:

- curiosity
- confidence in personal ability to explore materials and learn by direct study
- inventiveness
- perseverance: staying with an investigation over a sustained period of time
- appreciation of the value of experience and careful observation
- a willingness to work with others and to consider their ideas
- a sense of responsibility for actions taken
- respect for living things and environments and commitment for their care

Creating Colour

General Learner Expectation *Students will be able to*:

1-5 Identify and evaluate methods for creating colour and for applying pigments to different materials.

Specific Learner Expectations

Students will be able to:

1. Identify colours in a variety of natural and manufactured objects.
2. Compare and contrast colours using terms such as “lighter than”, “darker than”, “more blue”, “more bright”
3. Seriate colours based on a given criterion.
4. Predict and describe changes in colour which result from the mixing of primary colours; and from mixing a primary colour with white or with black.
5. Recognize that some materials such as coloured liquids and gels are largely transparent; and that some colours and pigments are not.
6. Compare the effect of different thicknesses of paint. Students should recognize that a very thin layer of paint, or a paint that has been watered down, may be partly transparent.

7. Compare the adherence of a paint to different surfaces, for example different forms of papers, fabrics and plastics.
8. Demonstrate that color can sometimes be extracted from one material and applied to another (for example by extracting a vegetable dye, or by paper chromatography)
9. Demonstrate at least one way to separate sunlight into component colours.

Seasonal Changes

General Learner Expectation *Students will be able to*:

1-6 Describe seasonal changes, and interpret the effects of seasonal changes on living things.

Specific Learner Expectations
Students will be able to:

1. Describe the regular and predictable cycle of seasonal changes
    - changes in sunlight
    - changes in weather
2. Identify and describe examples of plant and animal changes that occur on a seasonal basis
    - changes in form and appearance
    - changes in where living things are found
    - changes in activity (For example, students should recognize that many living things go into a dormant period during winter and survive under a blanket of snow as a seed or an egg.)
    - production of young on a seasonal basis
3. Identify human preparations for seasonal change, and activities that are done on seasonal basis.
4. Record observable seasonal changes over a period of time

Building Things

General Learner Expectations *Students will be able to*:

1-7 Use a variety of different materials in constructing objects, and models of objects.

1-8 Identify the purpose of different components of a personally constructed object or model, and identify corresponding components in a related object or model.

Specific Learner Expectations
Students will be able to:

1. Select appropriate materials (such as papers, plastics, woods) and design and build objects based on the following kinds of construction tasks:
    - construct model buildings; for example: homes (human, animal, from other cultures), garages, schools
    - construct model objects; for example: furniture, equipment, boats, vehicles

- construct toys; for example, pop-ups, figures
- create wind and water-related artifacts; for example: dams, waterwheels, boats

2. Identify component parts of personally constructed objects, and describe what each part is for.
3. Compare two objects that have been constructed for the same purpose, identify parts in one which correspond to parts in the another, and identify similarities and differences between them.
4. Recognize that products are often developed for specific purposes; and identify the overall purpose for each model and artifact constructed.

Senses

General Learner Expectations *Students will be able to:*

1-9 Use a variety of senses in making general and specific observations, and communicate observations through oral language and by producing captioned pictures.

1-10 Describe the role of their own senses, and the senses of other living things in enabling perception and action.

Specific Learner Expectations
Students will be able to:

1. Identify each of the senses and explain how we use our senses in interpreting the world.
2. Identify ways that our senses contribute to our safety and quality of life.
3. Apply particular senses in identifying and describing objects or materials provided, and in describing living things and environments.
4. Recognize the limitations of our senses, and identify example situations where our senses can mislead as (for example: feeling hot or cold, optical illusions, tasting with a plugged nose.)
5. Recognize that other living things have senses; and identify examples of ways that various animals use their senses (for example in sensing danger, finding food, recognizing their own young, and recognizing a potential mate)
6. Describe ways that people adapt to limited sensory abilities, or to the loss of a particular sense (for example, color blindness, or inability to see objects at close range)
7. Describe ways that we take care of our sensory organs, in particular our eyes and ears.

Needs Of Animals And Plants

General Learner Expectation *Students will be able to*:

1-11 Describe some common living things and identify needs of those living things.

Specific Learner Expectations

Students will be able to:

1. Contrast living and non-living things
2. Classify some common local plants and animals into groups on the basis of visible characteristics, e.g. adaptations for survival (claws, beaks, prickles)
3. Identify the requirements of animals to maintain life, (i.e.: air, food, shelter, water); and recognize that we must provide these to animals in our care
4. Identify the requirements of plants to maintain life, (i.e.: light, temperature, water, growing medium); and recognize that we must supply these requirements to plants in our care
5. Recognize that most land plants depend on soil
6. Give examples of ways that animals depend on plants, and ways that plants depend on animals (for example particular plants may serve as a source of food and shelter, animals may help spread pollen and seeds)
7. Recognize examples of animals that rely on human care (domesticated) and ones are able to live on their own (wild)
8. Appreciate the beauty and diversity of living things

GRADE LEVEL 2

Science Inquiry

General Learner Expectations *Students will be able to*:

2-1 With guidance, investigate the nature of things, demonstrating understanding of procedures followed, and confidence in ability to learn by direct investigation.

2-2 Recognize pattern and order in objects and events studied and, with guidance, record procedures and observations using pictures and words.

2-3 Make predictions and generalizations based on observations made.

Specific Learner Expectations

In the context of the units of study identified for grade level 2, the student will demonstrate the following **science inquiry skills:**

Focus
- identify the question which is being investigated
- identify one or more possible answers to the question

Plan
- identify materials to be used and how they will be used
- identify procedures to be followed
- with guidance, use print and other sources of information provided by teacher

Take Action
- carry out the identified procedures
- collect data through direct observation and manipulation of materials
- communicate observations orally and through captioned pictures

Evaluate
- explains results in terms of cause and effect (explanations of causation may reflect an early stage of concept development.
- identify possible applications of what was learned
- identify new questions that arise from what was learned

Technology and Problem Solving

General Learner Expectation *Students will be able to*:

2-4 With guidance, construct objects based on a given design, and construct variations of the design.

Specific Learner Expectations

In the context of the units of study identified for grade level 2, the student will demonstrate the following **technological problem-solving skills**:

Focus
- identify the purpose (What is it intended to do? How can it be done?)

Plan

- identify materials that could be used, and how they are to be used
- identify steps that may be followed in construction of an object
- with guidance, use print and other sources of information and ideas provided by teacher

Take Action

- show readiness to engage in all parts of the task, and to allow others to make their contribution
- demonstrate persistence and confidence in construction tasks
- communicates with others regarding steps in construction

Evaluate

- evaluate critically the product and identify possible improvements
- identify new applications

Attitudes

General Learner Expectation *Students will be able to*:

2-5 Demonstrate positive attitudes for the study of science and for the application of science in responsible ways.

Specific Learner Expectations

Students will show growth in acquisition and application of the following traits:

- curiosity
- confidence in personal ability to explore materials and learn by direct study
- inventiveness
- perseverance: staying with an investigation over a sustained period of time
- appreciation of the value of experience and careful observation
- a willingness to work with others and to consider their ideas
- a sense of responsibility for actions taken
- respect for living things and environments and commitment for their care

Exploration Of Liquids

General Learner Expectations *Students will be able to*:

2-6 Describe some properties of water and other liquids, and recognize the importance of water to living and non-living things.

2-7 Describe the interaction of water with different materials, and apply that knowledge to practical problems of liquid containment, mixing of materials, and separating water from other materials.

Specific Learner Expectations

Students will be able to:

1. Recognize that on cooling, liquid water freezes into ice; and that on heating it melts back into liquid water with properties the same as before.

2. Recognize that on heating, liquid water may be changed into steam or water vapor, and that this change can be reversed on cooling.
3. Recognize that water in open containers or on open surfaces will evaporate, but that water in closed containers or on covered surfaces will not.
4. Recognize that a wet surface dries more quickly when subject to wind or heating.
5. Apply an understanding of evaporation to practical situations such as drying of paints, clothes and hair.
6. Recognize that:
    - many things dissolve in water to form solutions
    - substances absorb water at different rates
    - some materials are waterproof and some are not
7. Recognize that water is a component of many materials and of living things.
8 Recognize human responsibilities for maintaining clean supplies of water

Buoyancy and Boats

General Learner Expectation *Students will be able to:*

2-8 Construct objects which will float on and move through water, and evaluate various designs for watercraft.

Specific Learner Expectations
Students will be able to:

1. Describe, classify and order materials on the basis of their buoyancy. (Students who have achieved this expectation will distinguish between materials that sink in water and those that float. They will also be aware that some "floaters" sit mostly above water, while others sit mostly below water. The terms *buoyancy* and *density* may be introduced, but are not required as part of this learning expectation.)
2. Alter or add to a floating object so that it will sink; and alter or add to a non-floating object so that it will float.
3. Assemble materials so they will float and be stable in water.
4. Evaluate the appropriateness of various materials to the construction of watercraft; in particular
    - the degree to which the material is waterproof (not porous),
    - the ability to form waterproof joints between parts,
    - the stiffness or rigidity of the material,
    - the buoyancy of the material.
5. Develop or adapt methods of construction that are appropriate to the design task.
6. Adapt the design of a watercraft so it can be propelled through water.
7. Explain why a given material, design, or component is appropriate to the design task.

Magnetism

General Learner Expectation *Students will be able to:*

2-9 Describe the interaction of magnets with other magnets, and with common materials.

Specific Learner Expectations
Students will be able to:

1. Identify where magnets are used in the child's environment and why we use them.
2. Distinguish materials that are attracted by a magnet from those that are not
4. Recognize that magnets attract materials with iron (or steel) in them
3. Recognize that magnets have polarity; demonstrate that poles may either repel or attract each other; state a rule for when poles will attract or repel each other
5. Design and produce a device that uses a magnet
6. Demonstrate that most materials are transparent to the effects of a magnet [a magnetic field will "pass through" such materials], whereas other materials interact with the magnet.

Hot & Cold & Temperature

General Learner Expectation *Students will be able to:*

2-10 Recognize effects of heating and cooling, and identify methods for heating and cooling

Specific Learner Expectations
Students will be able to:

1. Describe temperature in relative terms - hotter than, colder than
2. Measure temperature in degrees Celsius (°C)
3. Describe how heating and cooling materials can often change them (for example: melting and freezing, cooking, burning)
4. Identify safe practices for handling hot materials, and for avoiding potential dangers from heat sources.
5. Recognize that the human body temperature is relatively constant, and that a change in body temperature often signals a change in health
6. Identify ways that we can adjust the temperature in homes and buildings (for example by turning a thermostat up or down, opening or closing windows, using a space heater in a cold room)
7. Describe in general terms how local buildings are heated:
    - identify the fuel
    - recognize that most buildings are heated by circulating hot air or hot water
    - describe how heat is circulated through the school building, and in their own home
8. Recognize the role of insulation in keeping things hot or cold, and identify places where some form of insulation is used (for example: clothing, refrigerator, coolers, homes)

9. Design and construct a device to keep something hot or cold
10. Describe ways in which temperature changes affect us in our daily lives.

Small Crawling and Flying Animals and Their Environments

General Learner Expectation *Students will be able to*:

2-11 Describe the general structure, life cycle, and life habits of small crawling and flying creatures (e.g. insects, spiders, worms, slugs), and apply this knowledge in interpreting local species that the student has observed.

Specific Learner Expectations

Students will be able to:

1. Recognize that there are many different kinds of small crawling and flying animals, and identify a range of examples that are found locally
2. Compare and contrast small animals that are found in the local environment. Example animals should include at least three invertebrates; that is animals such as an insects, spiders, centipedes, slugs, and worms.
3. Recognize that the proper name for an "animal's home" is its *habitat,* and describe adaptations that make the animal suited to its particular habitat.
4. Identify the animals' role within the food chain. To meet this expectation students should be able to identify the animals as plant-eaters, animal eaters, or decomposers; and identify other animals which may use it as a source of food.
5. Describe the relationships of these animals to other living and non-living things in their habitat, and to people.
6. Describe conditions for care of one of these small animals, and maintain the animal through a complete life cycle.

GRADE LEVEL 3

Science Inquiry

General Learner Expectations *Students will be able to*:

3-1 Work individually or with others in investigating the nature of things, demonstrating purposeful action leading to observations and inferences.

3-2 Identify patterns and order in objects and events studied, and with guidance, record observations through pictures, words and charts (with guidance on the construction of charts), and make predictions and generalizations based on those observations.

Specific Learner Expectations

In the context of the units of study identified for grade level 3, the student will demonstrate the following science inquiry skills:

Focus
- identify the question which is being investigated
- identify one or more possible answers to the question (by stating an hypothesis or a prediction)

Plan
- with guidance identify sources for information and ideas, and access information and ideas from those sources
- identify materials to be used and how they will be used
- identify procedures to be followed

Take Action
- work independently or with others to carry out the identified procedures
- record observations and measurements accurately using captioned pictures and charts (with guidance in the construction of charts)

Evaluate
- state an inference based on observations (inference will identify cause and effect relationship that is supported by observations)
- identify possible applications of what was learned
- identify new questions that arise from what was learned

Technology and Problem Solving

General Learner Expectation *Students will be able to*:

3.3 **Work individually or with others in designing and carrying out an investigation of a practical problem and developing a possible solution, (given a problem that involves creating a structure, that can be built with materials that are available to the student).**

Specific Learner Expectations
In the context of the units of study identified for grade level 3, the student will demonstrate the following **technological problem-solving skills**:

Focus
- identify the purpose (What is to be developed? What is it for?)

Plan
- with guidance, identify sources for information and ideas, and access information and ideas from these sources
- identify materials that might be used, and how they might be used
- identify possible steps that might be used in completing the task (identify sub tasks and sequence)

Take Action
- engages in all parts of the task, and to allow others to make their contribution
- demonstrate persistence and confidence in construction tasks
- communicates with others, regarding the purpose or each step being followed

Evaluate
- evaluate the product and identify possible improvements
- identify new applications

Attitudes

General Learner Expectation *Students will be able to*:

3-4 Demonstrate positive attitudes for the study of science and for the application of science in responsible ways.

Specific Learner Expectations
Students will show growth in acquisition and application of the following traits:
- curiosity
- confidence in personal ability to learn and develop problem solving skills
- inventiveness and open-mindedness
- perseverance in the search for understandings and for solutions to problems
- flexibility in considering new ideas
- critical-mindedness in examining evidence and determining what the evidence means
- a willingness to use evidence as the basis for their conclusions and actions;
- a willingness to work with others
- appreciation of the benefits to be gained from shared effort and cooperation
- a sense of personal and shared responsibility for actions taken
- respect for living things and environments and commitment for their care

Rocks and Minerals

General Learner Expectation *Students will be able to*:

3-5 Demonstrate knowledge of materials that comprise the Earth's crust and skill in classifying these materials.

Specific Learner Expectations
Students will be able to:

1. Compare samples of various kinds rock and identify similarities and differences.
2. Given a description of the properties of a given rock or mineral, identify a sample rock or mineral that matches those properties. Properties that students should be able to interpret and apply include:
    - colour
    - lustre or "shinyness" (shiny, dull, glassy, metallic, earthy)
    - texture (rough, smooth, uneven)
    - hardness (based on scratch tests with available materials)
    - vinegar (acid) test
    - crystal shape for minerals, or overall pattern of rocks
3. Describe and classify a group of rocks and minerals based upon the above properties.
4. Recognize that rocks are composed of a variety of materials; and given a course-grained rock and magnifier, describe some of the component materials.
5. Recognize and describe the various components within a sample of soil (for example clay, sand, pebbles, decaying plants), and describe differences between two different soil samples.
6. Describe ways in which rocks break down to become soil, and demonstrate one or more of these ways (for example by shaking a group of small soft rocks in a jar of water, striking rocks together. *Note: safety goggles should be used.*)
7. Describe some common uses of rocks and minerals, and identify examples of those uses within the school, home or local community.

Building With A Variety of Materials

General Learner Expectations *Students will be able to*:

3-6 Safely use a variety of tools, techniques and materials in construction activities.

3-7 Construct structures using a variety of materials and designs, and compare the effectiveness of the various materials and designs for the intended purpose.

Specific Learner Expectations

Students will be able to:

1. Using a variety of materials and techniques; design, construct and test structures that are intended to:
    - support objects
    - span gaps
    - serve as containers
    - serve as a model of a living thing, object or building
2. Select appropriate materials for use in construction tasks, and explain the choice of materials. (Students should demonstrate familiarity with a variety papers, woods, and plastics)
3. Select tools that are suitable to a particular task and material; and use them safely and effectively.
4. Understand and use a variety of methods to join or fasten materials
5. Recognize that knowing the intended purpose and use of a structure helps determine the design and materials that should be used in making it
6. Appreciate that simple designs are often as effective as more complex ones, as well as being easier and cheaper to build.
7. Recognize the importance of good workmanship, and demonstrate growth towards good workmanship.
8. Maintain and store materials and tools properly
9. Apply skills of listening, speaking and cooperative decision making in working with other students on a construction project.

Testing Building Materials and Designs

General Learner Expectation *Students will be able to*:

3-8 Evaluate the suitability of different materials and designs for use in a building task.

Specific Learner Expectations

Students will be able to:

1. Recognize that effective structures must be sufficiently strong and stable, and that unstable or weak structures are often unsafe to use.
2. Describe the distinctive properties of some common solids such as wood, paper and plastic that make them suitable for use as building tasks.
3. Apply procedures to test the strength of construction materials (in particular different stocks of papers, plastics and wood).
4. Apply procedures to test different designs.
5. Apply procedures to test the strength of different methods of joining.
6. Identify and apply methods for making a structure stronger and more stable.

Hearing and Sound

General Learner Expectation *Students will be able to:*

3-9 Describe the nature of sound and demonstrate methods for producing and controlling sound.

Specific Learner Expectations

Students will be able to:

1. Identify examples of vibration.
2. Recognize that sound is the result of vibration and demonstrate that the larger the vibration, the louder the sound.
3. Recognize that that there are ways of measuring the loudness of sounds and that loud sounds pose a danger to the ear
4. Recognize that pitch is the result of differences in the rate of vibration.
5. Demonstrate a variety of ways of producing sounds by constructing and using sound-producing devices involving vibrating strings, striking objects, and blowing air.
6. Using sound-producing devices that the student has constructed, demonstrate methods for controlling the loudness, pitch and quality of sound produced
7. Identify examples that show that sound can travel through a variety of materials including solids, liquids and air, and that sound travels in all directions.
8. Describe how the human ear senses vibrations.
9. Recognize that certain sounds have characteristics that cause people to interpret them as pleasant or unpleasant
10. Construct and evaluate different kinds of sound-proofing and sound-amplifying devices
11. Explain the role that sound plays in communication

Animal Life Cycles

General Learner Expectations *Students will be able to:*

3-10 Describe the appearance and life cycles of some common animals, and identify adaptations to different environments.

3-11 Identify requirements for animal care.

Specific Learner Expectations

Students will be able to:

1. Classify a variety of animals based on observable characteristics (e.g. limbs, teeth, body covering, overall shape, backbone).
2. Observe and describe the growth and development of at least one living animal as the animal develops from early to more advanced stages. The animal(s) should be from one of the following groups: mammals, birds, fish, reptiles, amphibians, insects, spiders. (Suggested examples: gerbils, guppies, mealworms, tadpoles, worms, guppies, butterflies/moths, isopods, brine shrimp, local spiders)

3. Predict the next stages in the growth and development of at least one animal from each of the following groups: mammals, birds, fish, reptiles, insects, spiders and amphibians; and identify similarities and differences in their developmental sequences .
4. Identify the food needs of at least one animal from each of the following groups: mammals, birds, fish, reptiles, insects, spiders and amphibians; and describe changes in how the animal obtains food through different stages of its life.
5. Demonstrate awareness that parental care is characteristic of some animals and not others, and that the patterns of care take many forms.
6. Demonstrate awareness that animals require different habitats in order to meet their basic needs of food, water, shelter, and space.
7. Recognize adaptations of a young animal to its environment, and identify changes in its relationship to its environment as is it goes through life (e.g. Tadpoles are adapted for life in an aquatic environment; adult frogs show adaptations to both terrestrial and aquatic environments.)
8. Identify examples of environmental conditions that may threaten an animals survival; and identify examples of living things that are now extinct.
9. Recognize that habitat preservation can help maintain animal populations, and identify ways that student actions can assist habitat preservation.
10. Demonstrate knowledge of the needs of animals studied, and skills for their care.

GRADE LEVEL 4

Science Inquiry

General Learner Expectations *Students will be able to:*

4-1 Work independently or with others in investigating the nature of things, demonstrating purposeful action leading to inferences supported by observations.

4-2 Identify patterns and order in objects and events studied, and with guidance, record observations through pictures, words and charts, and make predictions and generalizations based on those observations.

Specific Learner Expectations

In the context of the units of study identified for grade level 4, the student will demonstrate the following **science inquiry skills:**

Focus

- identify the question which is being investigated
- identify one or more possible answers to the question (by stating an hypothesis or a prediction)

Plan

- identify sources for information and ideas, and access information and ideas from these sources.
- identify materials to be used and how they will be used
- identify procedures to be followed
- with guidance, select procedures that comprise a "fair test"

Take Action

- work cooperatively with others in carrying out the identified procedures
- record observations and measurements accurately using captioned pictures and charts (with guidance in the construction of charts)

Evaluate

- state an inference based on observations (inference will identify cause and effect relationship that is supported by observations)
- recognize procedures that are not appropriate to a "fair test"
- identify possible applications of what was learned
- identify new questions that arise from what was learned

Technology and Problem Solving

General Learner Expectation *Students will be able to:*

4-3 Work independently or with others to make a structure or mechanical device that achieves a given purpose.

Specific Learner Expectations

In the context of the units of study identified for grade level 4, the student will demonstrate the following **technological problem-solving skills**:

Focus

- identify the purpose of problem solving and construction activities (What problem do we need to solve? What do we need to make? What must the thing we construct be able to do?)

Plan

- identify sources for information and ideas, and demonstrate skill in accessing them.
- work independently or with others to identify a general approach to the task
- identify appropriate materials that might be used, and how they might be used
- identify ways a team could work together to complete the task

Take Action

- show readiness to engage in all parts of the task, and to allow others to make their contribution
- demonstrate persistence and confidence in construction tasks
- demonstrates readiness and ability to modify a procedure when needed (troubleshooting)
- communicates with group members, showing ability to both contribute and receive ideas

Evaluate

- evaluate the design and identify possible improvements
- identify new applications

Attitudes

General Learner Expectation *Students will be able to*:

4-4 Demonstrate positive attitudes for the study of science and for the application of science in responsible ways.

Specific Learner Expectations

Students will show growth in acquisition and application of the following traits:

- curiosity
- confidence in personal ability to explore materials and learn by direct study
- inventiveness and willingness to consider new ideas
- perseverance in the search for understandings, and for solutions to problems
- a willingness to base their conclusions and actions on the evidence of their own experience
- a willingness to work with others in a shared activity, and in the sharing of experience
- appreciation of the benefits of shared effort and cooperation
- a sense of responsibility for personal and group actions taken
- respect for living things and environments and commitment for their care

Waste and Our World

General Learner Expectation: *Students will be able to:*

4.5 Recognize that human activity can lead to the production of wastes, and identify alternatives for the responsible use and disposal of materials.

Specific Learner Expectations

Students will be able to:

1. Identify plant and animal wastes and describe how they are recycled in nature. (For example, plant leaves serve as a source of food for soil insects, worms, and other creatures. The wastes of these creature may then be further broken down by molds and fungi.)
2. Identify and classify wastes that result from human activity.
3. Describe alternate methods of disposal and identify possible advantages and disadvantages of each.
4. Distinguish between wastes which are readily biodegradable and those that are not.
5. Compare different kinds of packaging, and infer the relative advantages and disadvantages of that packaging. (In evaluating different forms of packaging, students should demonstrate the ability to consider both a consumer perspective and an environmental perspective.)
6. Identify methods of waste disposal currently used within the local community.
7. Identify kinds of wastes which may be toxic to people and to the environment.
8. Identify alternative materials and processes that may lessen the amount of waste produced (for example: reducing wastage of food, using both sides of paper)
9. Identify ways in which materials can be reused or recycled, including examples of things that the student has done.
10. Develop a flow chart for a consumer product that indicates the source materials, final product and method of disposal
11. Identify actions which individuals and groups can take to minimize the production of wastes, to recycle or reuse wastes, and to ensure their safe handling and disposal.
12. Develop a plan to reduce waste, and monitor what happens over a period of time.

Building Devices and Vehicles That Move

General Learner Expectation: *Students will be able to*:

4-6 Construct a mechanical device for a designated purpose, using materials and design suggestions provided. (One or more components of the task will be open ended and require the student to determine the specific procedure to be followed.)

4-7 Explore and evaluate variations to the design of a mechanical device, demonstrating that control is an important element in the design and construction of that device.

Specific Learner Expectations

Students will be able to:

1. Design and construct devices and vehicles that move or have moving parts (linkages, wheels and axles)
2. Use simple forces to power or propel a device (e.g. direct pushes, pulls, use of cranking mechanisms, moving air and moving water)
3. Design and construct devices and vehicles that employ energy-storing or energy-consuming devices to cause motion (e.g. elastic bands, springs, gravity, wind, moving water, batteries)
4. Understand that moving from place to place requires time, and that the shorter the time the faster the movement
5. Recognize the need for control in mechanical devices; and apply control devices where necessary.
6. Evaluate a design based on a given set of questions or criteria. The criteria / questions may be provided by the teacher or developed by students. Example criteria include: Effectiveness *(Does it work?),* Reliability *(Does it work every time?)* Durability *(Does it stand up to repeated use?),* Effort *(Is it easy to construct? Is it easy to use?),* Safety *(Are there any risks of hurting oneself in making it or using it?)* Use of materials *(Can it be made cheaply with available materials?)*
7. Compare two designs, identifying the relative strengths and weaknesses of each.
8. In cooperation with other students, design, construct and operate a production line, in which multiple sets of the same product are made

Wheels and Levers

General Learner Expectation: *Students will be able to:*

4-8 Demonstrate a practical understanding of wheels and levers by constructing devices in which energy and motion are transferred.

Specific Learner Expectations

Students will be able to:

1. Explain how rollers can be used to move an object; and demonstrate the use of rollers in a practical situation.
2. Compare the wheel and the roller; and identify examples where each are used..
3. Apply and explain the use of a wheel and axle in situations such as:
   - as part of a vehicle
   - in a pulley system
   - in a gear system
4. Construct and explain the operation of a drive system that uses one or more of the following:
   - wheel-to-wheel contact
   - a belt or elastic
   - a chain
   - cogs or gears

5. Construct and explain the operation of a drive system that transfers motion from one shaft to a second shaft, where the second shaft is:
    - parallel to the first
    - at a 90° angle to the first.
6. Describe and construct devices that demonstrate how levers accomplish the following:
    - use a force to cause movement
    - use a smaller force to create a larger force
    - use a small/large movement to create a large/small movement
7. Construct models and explain how levers are involved in such devices as: teeter-totters, scissors, pliers, pry bars, tongs, nut crackers, fishing rods, wheel barrows

Light and Shadows

General Learner Expectation *Students will be able to*:

4-9 Identify sources of light, describe the interaction of light with different materials, and infer the pathway of a light beam.

Specific Learner Expectations

Students will be able to:

1. Identify a wide range of sources of light, including the sun, various forms of electric lights, flames, and luminescent materials
2. Distinguish objects that emit their own light from those that require an external source of light to be seen.
3. Recognize that light travels outward from a source, and continues unless blocked by an opaque material
4. Recognize that a blockage of light results in a shadow, and that the size of a shadow increases with distance.
5. Recognize that when an object is shaded by another, the shaded object is located in line with the light source and the object that is casting the shade.
6. Recognize that materials that one can see through (transparent materials) cast only faint shadows; whereas ones that one cannot see through (opaque materials) cast dark shadows
7. Classify materials as transparent, partly transparent (translucent), or opaque.
8. Recognize that light can be bent (refracted), and that such objects as aquaria, prisms and lenses can be used to show that the light beams are bent.
9. Recognize that light can be broken into colours and that different colours of light can be combined to form a new colour.
10. Demonstrate the ability to use a variety of optical devices, describe how they are used, and describe their general structure. Suggested examples include hand lens, telescope, microscope, pin hole camera, light-sensitive paper, camera, kaleidoscope. (Students meeting this expectation should be able to provide practical descriptions of the operation of such devices, but are not required to provide theoretical explanations of how the devices work.)
11. Recognize that the sun should not be viewed directly, or by use of binoculars or telescopes; and describe the dangers involved

Plant Growth and Changes

General Learner Expectation *Students will be able to:*

4-10 Demonstrate knowledge and skills for the study, interpretation, propagation and enhancement of plant growth

Specific Learner Expectations

Students will be able to:

1. Describe the importance of plants to humans, and as part of the natural environment.
2. Classify common plants on the basis of visible characteristics, and on the basis of plant uses
3. Recognize that plant requirements for growth (air, light, water, growing medium) vary from plant to plant; and that other conditions (for example temperature and humidity) may also be important to the growth of particular plants.
4. Identify examples of plants that have special needs.
5. Recognize that a variety of plant communities can be found within the local area, and that differences in plant communities are related to variations in the amount of light, water, and other conditions.
6. Recognize that plants of the same kind have a common life cycle, and produce new plants which are similar but not identical to the parent plants.
7. Describe ways that various flowering plants can be propagated, including from seed, from cuttings, from bulbs and by runners
8. Nurture a plant through at least one complete life cycle: from seed to seed. *[The plant Brassica Rapa is a fast growing plant that is particularly suited to plant care and observation studies in a classroom setting. See implementation guide for further information.]*
9. Describe the care and growth of a plant that students have nurtured, in particular
    - Identify the light, temperature, water, and growing medium requirements of the plant.
    - Identify the life stages of the plant
    - Identify the reproductive structures of the plant

GRADE LEVEL 5

Science Inquiry

General Learner Expectations *Students will be able to*:

5-1 Work cooperatively with others to design and carry out an investigation that comprises a fair test (involving objects and events that are within the student's direct experience, and based on an idea about those objects or events that is accessible to direct investigation by the student).

5-2 Recognize the importance of accuracy in observation and measurement, and with guidance, apply suitable methods to record, compile and interpret observations and measurements gathered by self and group.

Specific Learner Expectations

In the context of the units of study identified for grade level 5, the student will demonstrate the following **science inquiry skills:**

Focus

- identify the question which is being investigated
- identify one or more possible answers to their questions (by stating an hypothesis or a prediction)

Plan

- identify sources for information and ideas, and demonstrate skill in accessing these sources.
- identify a way of testing the idea
- identify procedures to be followed
- identify variables that need to be held constant to ensure a fair test

Take Action

- work individually or with others in following the procedures (procedures developed by student(s), or presented by the teacher)
- record observations and measurements accurately
- modify the plan as necessary

Evaluate

- evaluate how well the procedures worked, and identify possible improvements
- state an inference based on observations
- identify possible applications of what was learned
- identify new questions that arise from what was learned

Technology and Problem Solving

General Learner Expectation *Students will be able to*:

5-3 Work cooperatively with other students in designing and carrying out an investigation of a practical problem and developing a possible solution, (given a problem that involves construction of a mechanical device with electrical components).

Specific Learner Expectations

In the context of the units of study identified for grade level 5, the student will demonstrate the following **technological problem-solving skills**:

Focus

- identify problems to be solved, and the purpose of the problem-solving activity (What problem are we trying to solve? What conditions must be met? What kind of controls are required? How will we know that we have done what we set out to do?)
- **Plan**
- identify sources for information and ideas, and demonstrate skill in accessing these sources.
- work cooperatively with others to identify a general approach to the task
- identify materials that might be used, and how they might be used appropriately
- identify possible steps that might be used in completing the task
- identify ways a team could work together to complete the task

Take Action

- show readiness to engage in all parts of the task, and to allow others to make their contribution
- demonstrate persistence and confidence in construction tasks
- demonstrates readiness and ability to modify a procedure when needed (troubleshooting)
- demonstrates readiness and skill in communicating ideas cooperatively with group members, including listening, speaking, gesture, drawing and creating of models.

Evaluate

- evaluate the product or process developed and identify possible improvements
- evaluate the product/process in terms of its benefit to society
- evaluate the procedures used, and identify possible improvements
- identify new applications

Attitudes

General Learner Expectation: *Students will be able to*:

5.4 Demonstrate positive attitudes for the study of science and for the application of science in responsible ways.

Specific Learner Expectations

Students will show growth in acquisition and application of the following traits:

- curiosity
- confidence in personal ability to explore materials and learn by direct study
- inventiveness and willingness to consider new ideas
- perseverance in the search for understandings, and for solutions to problems
- a willingness to base their conclusions and actions on the evidence of their own experience

- a willingness to work with others in a shared activity, and in the sharing of experience
- appreciation of the benefits of shared effort and cooperation
- a sense of responsibility for personal and group actions taken
- respect for living things and environments and commitment for their care

Electricity and Magnetism

General Learner Expectations: *Students will be able to*:

5-6 Demonstrate safe methods for the study of magnetism and electricity, identify methods for measurement and control, and apply techniques for evaluating magnetic and electrical properties of materials.

Specific Learner Expectations

Students will be able to:

1. Recognize and appreciate the potential dangers involved in using sources electrical current:
    - understand that household electrical current is potentially dangerous and not a suitable source for experimentation
    - understand that small batteries are a relatively safe source of electricity for experimentation and study, but that care should be taken to avoid short circuits *(Short circuits may cause wires to heat up, as well as waste the limited amount of energy in the battery.)*
2. Describe and demonstrate example activities that show that electricity and magnetism are related
    - demonstrate that electricity can be used to create magnetism
    - demonstrate that a moving magnet can be used to generate electricity
3. Demonstrate and interpret evidence of magnetic fields by use of iron filings, or by use of one or more compasses
4. Demonstrate that a continuous loop of conducting material is needed for an uninterrupted flow of current in a circuit
5. Distinguish electrical conductors (materials that allow electricity to flow through them) and insulators (materials do not allow the flow of electricity through them)
6. Recognize and demonstrate that some materials (including resistors) are partial conductors of electricity
7. Predict the effect of placing an electrical resistance in a simple circuit with a light bulb or electric motor
8. Recognize that a kilowatt hour is a unit to measure the amount of household electricity used
9. Interpret and explain:
    - the reading on a household electrical meter
    - efficiency labels on electrical appliances

Mechanisms Using Electricity

General Learner Expectation *Students will be able to*:

5-5 Construct simple circuits, and apply an understanding of circuits to the construction and control of motorized devices.

Specific Learner Expectations
Students will be able to:

1. Identify example applications of electrical devices in the school and home environment, and classify the kinds of uses. (Categories of electrical use may include such things as: heating, lighting, communicating, moving, computing)
2. Design and construct circuits that operate lights and other electrical devices
3. Recognize the importance of switches and other control mechanisms to the design and operation of electrical devices
4. Construct and use a variety of switches
5. Design and construct toys or vehicles that use a battery-powered electric motor to produce motion
6. Design and construct a burglar alarm
7. Demonstrate different ways of lighting two lights from a single power source, and compare the results Student should recognize that wiring two bulbs in series makes both bulbs glow less brightly than if the bulbs are parallel wired. Students may demonstrate this knowledge operationally, and do not need to use the terms *series* and *parallel.*
8. Demonstrate different ways of using two batteries to light a bulb, and compare the results. Students should recognize that wiring the batteries in series causes the bulb to glow brighter.
9. Given a design task and appropriate materials, invent and construct an electrical device that meets the task requirements

Classroom Chemistry

General Learner Expectation *Students will be able to*:

5-7 Describe the properties and interactions of various household liquids and solids, and interpret their interactions.

Specific Learner Expectations
Students will be able to:

1. Recognize examples of the following kinds of mixtures:
   - two or more solids (e.g. sand and sugar)
   - a solid and a liquid (e.g. sugar and water)
   - two or more liquids (e.g. milk and tea)
2. Apply and evaluate a variety of techniques for separating materials where one of the components is a liquid and one is a solid.
3. Distinguish substances that will dissolve in a liquid from those that will not, and demonstrate a way of recovering a material from solution
4. Demonstrate a procedure for making a crystal

5. Recognize that the surface of water has distinctive properties, and describe the interaction of water with other liquids and solids
6. Produce carbon dioxide gas through the interaction of solids and liquids and demonstrate that it is different from air
7. Distinguish between reversible and irreversible changes of materials, and give examples of each
8. Recognize and describe evidence of a chemical reaction; explain how the products of a reaction differ from original substances
9. Use an indicator to identify a solution as being acidic or basic

Weather Watch

General Learner Expectations *Students will be able to*:

5-8 Observe, describe and interpret weather phenomena, and identify effects of the weather.

5-9 Demonstrate skill in investigating and evaluating different preparations for weather.

Specific Learner Expectations
Students will be able to:

1. Recognize that a descriptions of weather includes information about temperatures, precipitation, wind, pressure, humidity and sky cover.
2. Recognize, describe and measure different forms of precipitation: in particular rain, hail, sleet and snow
3. Describe and demonstrate methods for measuring wind speed
4. Record weather over a period of time
5. Identify some common types of clouds and relate them to weather patterns
6. Identify evidence for an anticipated weather change and the kind of change which is likely to occur. (For example, a drop in pressure as indication of unsettled weather, cirrus clouds as an indication of an approaching cold front)
7. Measure at least four different kinds of weather phenomena (Either student-constructed or standard instruments may be used.)
8. Recognize that weather systems are generated because different surfaces on the face of the Earth retain and release heat at different rates
9. Interpret climate as the total of the weather in a particular region; recognize that climate varies throughout the world
10. Appreciate how important it is to be able to forecast weather and to have suitable clothing or shelter to endure various types of weather
11. Test fabrics and clothing designs to choose ones that most effectively meet the challenges of particular weather conditions (water resistance, wind resistance and protection from cold)

Pond Ecosystem

General Learner Expectation *Students will be able to*:

5-10 Describe the living and non-living components of a pond water ecosystem and the interactions within and among them.

Specific Learner Expectations

Students will be able to:

1. Understand that a pond ecosystem involves the interactions between the living and non-living things, both in and around the water
2. Identify some of the common plants and animals found at a pond site, both in and around the water; describe the life cycle of these plants and animals
3. Recognize adaptations that make certain plants and animals suited for pond life
4. Understand and appreciate that all animals and plants, not just the large ones, have an important role in the pond community
6. Recognize that living things within a community can be classified according to their role within food chains, and apply this knowledge to a pond community:
    - recognize green plants as producers (organisms that make their own food using light), and knows that green plant are essential to all other life forms
    - recognize decomposers such as molds and fungus
    - recognize that animals are consumers
    - recognize that some animals consume plants, some consume other animals, and some consume both animals and plants
7. Identify examples of each of the above roles within a pond ecosystem
8. Draw a diagram of food chains and food webs, and interpret such diagrams.
9. Recognize that some aquatic animals use oxygen from air and others from water, and identify examples and adaptations of each
10. Recognize that various human actions can enhance or threaten the abundance or survival of living things in aquatic environments
11. Identify human actions that can affect a pond ecosystem, for example: adding pollutants, increasing or decreasing the flow of water into a pond, trapping or hunting of pond wildlife, habitat enhancement
12. Recognize that changes in part of an environment have effects on the whole environment.

GRADE LEVEL 6

Science Inquiry

General Learner Expectations *Students will be able to*:

6-1 Work cooperatively with others to design and carry out an investigation in which variables are identified and controlled (involving objects and events that are within the student's direct experience, and based on an idea about those objects or events that is accessible to direct investigation by the student).

6-2 Recognize the importance of accuracy in observation and measurement, and apply suitable methods to record, compile, interpret, and evaluate observations and measurements gathered by self and group.

Specific Learner Expectations

In the context of the units of study identified for grade level 6, the student will demonstrate the following **science inquiry skills:**

Focus
- identify the question which is being investigated
- identify one or more possible answers to their questions (by stating an hypothesis or a prediction)

Plan
- identify sources for information and ideas, and demonstrate skill in accessing them.
- identify a way of testing the idea
- identify procedures to be followed
- identify variables that are important to the procedures:
  - identify what will be varied
  - identify what will be held constant (controls or control variables)
  - identify what is to be observed to find out how it changes

Take Action
- work cooperatively with others to carry out the procedures (procedures developed by student(s), or presented by the teacher)
- record observations and measurements accurately
- modify the plan as necessary

Evaluate
- consider alternate explanations for observations
- state an inference which explains observations
- identify possible applications of what was learned
- identify new questions that arise from what was learned
- evaluate how well the procedures worked, and identify possible improvements

Technology and Problem Solving

General Learner Expectation *Students will be able to:*

6-3 Work cooperatively with others in designing and carrying out an investigation of a practical problem and developing a possible solution.

Specific Learner Expectations

In the context of the units of study identified for grade level 6, the student will demonstrate the following **technological problem-solving skills**:

Focus

- identify problems to be solved, and the purpose(s) of problem solving activities (What problem(s) are we trying to solve? What resources can we use? How will we know that we have done what we set out to do? What possible impacts do we need to consider?)

Plan

- identify sources for information and ideas, and demonstrate skill in accessing them.
- work cooperatively with others in identifying alternative designs and approaches to construction (or problem solution), and select one or more alternative to try
- identify steps that may be used in completing the task (identify subtasks and sequence)
- identify ways a team could work together to complete the task

Take Action

- show readiness to engage in all parts of the task, and to allow others to make their contribution
- demonstrate persistence and confidence in construction tasks
- demonstrates readiness and ability to modify a procedure when needed (troubleshooting)
- demonstrates readiness and skill in communicating ideas cooperatively with group members, including listening, speaking, gesture, drawing and creating of models.

Evaluate

- evaluate the product or process developed and identify possible improvements
- identify positive and negative impacts that may arise, and potential risks that need to be monitored (What good effects and what bad effects could this solution have? What would we need to look for to be sure that it is working as intended?)
- evaluate the procedures used, and identify possible improvements
- identify new applications

Attitudes

General Learner Expectation *Students will be able to*:

6-4 Demonstrate positive attitudes for the study of science and for the application of science in responsible ways.

Specific Learner Expectations

Students will show growth in acquisition and application of the following traits:

- curiosity
- confidence in personal ability to learn and develop problem solving skills
- inventiveness and open-mindedness
- perseverance in the search for understandings and for solutions to problems
- flexibility in considering new ideas
- critical mindedness in examining evidence and determining what the evidence means
- a willingness to use evidence as the basis for their conclusions and actions;
- a willingness to work with others
- appreciation of the benefits to be gained from shared effort and cooperation
- a sense of personal and shared responsibility for actions taken
- respect for living things and environments and commitment for their care

Air and Aerodynamics

General Learner Expectation *Students will be able to*:

6.6 Describe properties of air, and the interactions of air with objects in flight.

Specific Learner Expectations

Students will be able to:

1. Provide evidence that air takes up space and exerts pressure; identify examples of these properties in everyday applications
2. Provide evidence that air is a fluid and is capable of being compressed; identify examples of these properties in everyday applications
3. Describe and demonstrate instances in which air movement across a surface results in lift (Bernoulli's principle)
4. Recognize that in order for devices or living things to fly, they must have sufficient lift to overcome the downward force of gravity
5. Identify adaptations that enable birds and insects to fly
6. Describe the means of propulsion for flying animals and for aircraft
7. Recognize that streamlining reduces drag, and predict the effects of specific design changes on the drag of a model aircraft or aircraft components
8. Recognize that air is composed of different gases, and identify evidence for different gases. (Example evidence may include effects on flames, the "using up" of a particular gas by burning or rusting, and the animal needs for air exchange.)

Flight

General Learner Expectation *Students will be able to:*

6-5 Construct devices that move through air, and identify adaptations for controlling flight.

Specific Learner Expectations

Students will be able to:

1. Conduct tests of a model parachute design, and identify design changes to improve the effectiveness of the design
2. Describe the design of a hot air balloon, and demonstrate construction of a model hot air balloon using simple materials.
3. Conduct tests of glider designs, and modify a design so that it will go further, or stay up longer, or fly in a desired way (for example: fly in a loop, turn to the right)
4. Recognize the importance of stability and control to aircraft flight; and design, construct, and test control surfaces.
5. Apply appropriate vocabulary in referring to control surfaces and major components of an aircraft. This vocabulary should include: fuselage, vertical and horizontal stabilizer, aileron, rudder
6. Construct and test propellers and other devices for propelling a model aircraft.
7. Describe differences in design between aircraft and spacecraft, and identify reasons for those differences in design.
   (Note: model aircraft or rockets may be constructed and used as part of this unit. It is recommended that these models be simple devices of the student's construction, not prefabricated models. Propulsion of rockets by chemical fuels is neither required nor recommended, due to safety considerations.)

Evidence and Investigations

General Learner Expectations *Students will be able to:*

6-7 Apply observation and inference skills to recognize and interpret patterns, and to distinguish a specific pattern from among a group of similar patterns.

6-80 Apply a knowledge of the properties and interactions of materials to the investigation and identification of a material sample.

Specific Learner Expectations

Students will be able to:

1. In a natural outdoor setting, recognize evidence of recent human activity, and recognize evidence of animal activity.
2. Observe a set of footprints and infer the direction and speed of travel
3. Recognize that evidence found at the scene of an activity may have unique characteristics that allows an investigator to make inferences about the participants and nature of the activity
4. Investigate the following types of evidence and link them to a possible source by:

- classifying fingerprints collected from a variety of surfaces
- classifying footprints, tire prints and soil samples from a variety of locations
- analyzing the ink from different pens using paper chromatography
- analyzing handwriting samples to identify the handwriting of a specific person
- comparing samples of fabric

Sky Science

General Learner Expectation *Students will be able to*:

6-9 Observe, describe and interpret the movement of objects in the sky, and identify pattern and order in those movements.

Specific Learner Expectations

Students will be able to:

1. Recognize that the Sun and stars emit the light by which they are seen, and that most other bodies in space (including the earth's moon, planets and their moons, comets and asteroids) are seen by reflected light.
2. Describe the location and movement of a star as it moves though the night sky. Students should be able to report on the movement of a specific star based on personal observation, using some form of reference frame and/or star finder.
3. Recognize that the apparent movement of objects in the night sky is regular and predictable, and that the daily cycle of movements is due to the earth's rotation.
4. Construct and use a device for plotting the apparent movement of the sun over the course of a day.
5. Describe seasonal changes in the length of the day and night and in the angle of the sun above the horizon.
6. Recognize that the moon's phases are regular and predictable and that the shapes are repeated in a regular cycle
7. Illustrate the phases of the moon in drawings, and by use of improvised models (An improvised model might involve such things as a table lamp and nerf ball)
8. Recognize that the other eight known planets which revolve around the sun, have characteristics and surface conditions that are different from the earth, and describe examples of those differences.
9. Recognize that not only the earth, but other planets have moons, and that the characteristics of those moons are different from those of the earth.
10. Identify technologies and procedures by which knowledge about planets and other objects in the night sky have been gathered.

Tree and Forest

General Learner Expectation *Students will be able to:*

6-10 Describe characteristics of trees and the interaction of trees with other living things in the local environment.

Specific Learner Expectations

Students will be able to:

1. Identify reasons that trees and forests are valued
2. Identify general characteristics that distinguish trees from other plants, and that distinguish deciduous and coniferous trees.
3. Identify characteristics of at least four trees found in the local environment. (Students should be familiar with at least two deciduous trees and two coniferous trees. The examples should include native species such as spruce, birch, poplar and pine, and may include cultivated species such as elm and crabapples.)
4. Interpret the growth pattern of a young tree, and distinguish this year's growth from that of the previous year, and from the year before that.
5. Describe and classify leaf shapes, leaf arrangements, branching patterns, and the overall form of a tree.
6. Describe kinds of plants and animals found living on, under and among trees; and interpret how trees may affect and be affected by those living things.
7. Describe the role of trees in nutrient cycles.
8. Identify human uses of forests, and compare modern and historical patterns of use.
9. Identify human actions which enhance or threaten the existence of forests.
10. Identify an issue regarding forest use, and identify different perspectives on that issue.

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